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PHYSICO-CHEMICAL AND MICROBIOLOGICAL ANALYSIS OF DIFFERENT RIVER WATERS IN NIPHAD AREA NASIK DIST (MAHARASHTRA) INDIA

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ABSTRACT

Rivers are lifeline of any country .In present study Physico-chemical analysis were carried out on different rivers samples viz: Parashari, Vinta, Kadva from Taluka Niphad Dist Nasik ,(Maharashtra)India. The results obtained were compared with WHO standards for drinking and recreational water .Different physico-chemical parameters like pH, Do, BOD, TDS were assessed. The most probable number (MPN) count were done by multiple tube fermentation technique. The comparative result showed pH(7.4 to 8), Do(3mg/lit to 4.5 mg/lit), BOD(11.4 to 15 mg/lit), TDS(1600-1800μ/lit).All water samples were found to harbor coliform group of organisms greater than the required WHO standards of water ,total coliforms were generally high exceeding the limit for water. The MPN count was in the range from (1600 to 1800/100ml)

Keywords: Physico-chemical parameters, Niphad area, MPN, River Water

INTRODUCTION:

Water is the most essential requirement of life .Water of good drinking quality is of basic importance to human physiology and has many commercial uses. Before water can be described as potable ,it has to comply with certain physical, chemical and microbiological standards to ensure that water is safe for drinking .Water can be obtained from number of sources among which rivers are important fresh water resource .India is land which has 14 major and 55 minor river system and 100's of small rivers. Unfortunately river get polluted by municipal and industrial wastewater and runoff from agriculture land. High values of pollutants in river system causes an increase in Dissolved oxygen(DO),Biological oxygen demand(BOD),Total dissolved solids(TDS) etc.Any alternation in these parameters my disturb the quality of water. Dissolved oxygen is of great importance to all living organisms and can be considered as sole parameter to reveal the nature of whole water body. Since water quality and human health are closely realated, water analysis before use is prime importance. This work is therefore an attempt to examine and analyze the comparative physico-chemical and microbial analysis of 3 river samples using standard methods.

MATERIALS AND METHODS:

Study area and collection of waters: Water samples were collected from 3 different rivers located in Niphad area .The sampling site's and locations are shown in Table-1. Each river sample was collected in a sterile bottle's and transferred immediately to the laboratory for further processing.

Physico-chemical analysis: The parameters like $P^{H.}$ temperature, dissolved oxygen (DO), Biological oxygen demand (BOD), Total dissolved solids(TDS) were analyzed by standard procedures (APHA 1980)

Microbiological analysis:

Microbial analysis of river water samples were studied within 24 hrs of collection. The most probable number-multiple tube technique was used for coliform enumeration.

RESULT AND DISCUSSION:

Result details of physico-chemical and microbial analysis of water are given in Table-2 and Table -3.The pH of water samples from each river was in the range 7.4 to 8,which was in normal range suitable for aquatic life -**Graph 1.(Chapman.D.1996)**.Temperature of all rivers samples was in normal range from 28°C -29°C .Comparative study of dissolved oxygen was maximum in Kadva river 4.5mg/lit and lowest in Vinta river 3mg/lit .Dissolved oxygen is a measure of one of the important environmental factor affecting aquatic life and of capacity of water to receive organic matter without causing nuisance(**Wetzel,1999**).BOD content at above 3 sites was observed to be 11.4, 14, 15 mg/lit which was found to be more as per standard requirement of 4-6 mg/lit (**WHO standards,2003.**) .TDS ranges from 1600-1800 µ/lit .Result of bacteriological analysis of water sample is given in. **Table 2**.The most probable number (MPN) for presumptive total coliform count of the water samples ranges from 1600 to >1800 MPN per 100 ml.Water samples from Parashari and Kadva showed highest coliform count than Vinta river which was 1600 MPN per100 ml.Accordingly, the total coliform count for all samples were exceedingly high as per WHO and EPA standards, for coliform bacteria in drinking water of zero total coliform per 100 ml of water (EPA 2003).The high coliform count obtained in the samples may be an indication that the water sources are faecally contaminated (**Osuinde and Enruzie, 1999**)
According to study of **Baxter –Potter and Gilliland (1988)** on straight river cotton shed, when precipitation and stream flows are high, the influence of continuous sources of pollution such as sewage treatment plants.It is a common practice for people living river side to discharge their domestic and agricultural water as well as washing of animals into rivers due to that there is direct contaminantion of river water with faeces and urine of animals.(**KariKari .A.Y,2006**)

CONCLUSION AND RECOMMENDATION:

Physico –chemical and microbial analysis of water sample of rivers from Niphad area, Nasik Dist. indicated that they are unfit for human consumption though they can be used for other purposes. Results obtained showed slight variation between water qualities of the rivers. Presence of high number of coliforms in all samples indicated that there is feacal contamination which should we control by creating awareness among the people to maintain quality of river water .Water quality should be control in order to minimize acute problem of water related disease which are endemic to the health of man.

Table.1: Location of sampling areas

Sr.no	River name	Location	District
1	Parashari	Pimpalgaon (B)	Nasik
2	Vinta	Ugaon	Nasik
3	Kadva	Niphad	Nasik

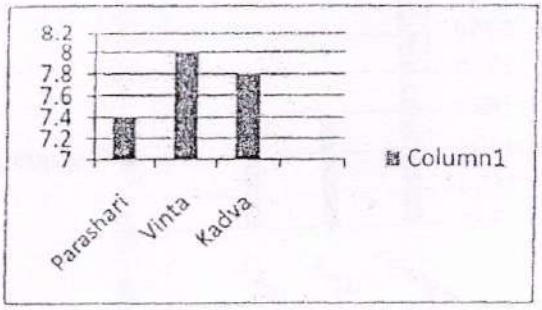
Table.2 Study of different Physico-Chemical parameters and their results

Sr.no	Parameters	Standard values	Parashari	Kadva	Vinta
1	P^H	6-8.5	7.4	8	7.8
2	Temperature	-	28° C	28° C	29° C
3	DO(mg/lit)	>6	3.1	4.5	3
4	BOD(mg/lit)	4-6	11.4	14	15
5	TDS(µ/lit)	1500	1800	1650	1600

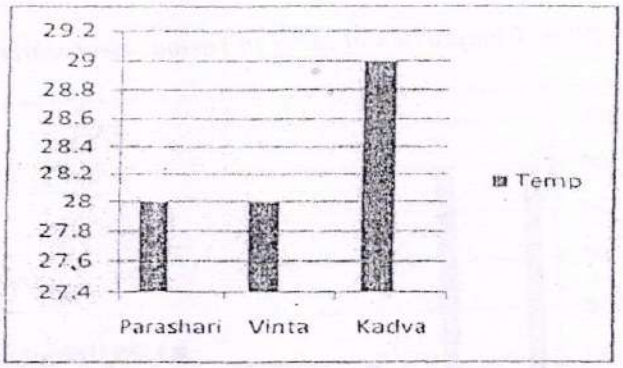
Table.3: Most probable number of river water samples.

Sr.no	Samples	MPN/100 ml
1	Parashari	>1800
2	Kadva	>1800
3	Vinta	1600

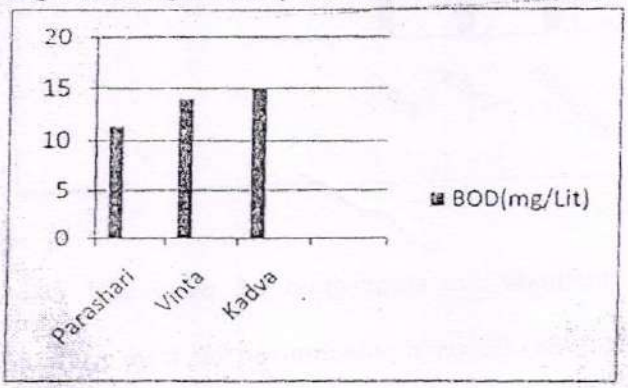
Graph.1 Comparison in PH of various river water



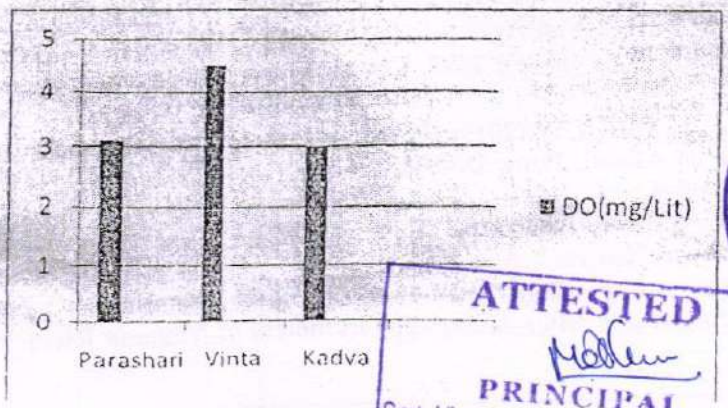
Graph.2: Comparison of temperature of different river water samples



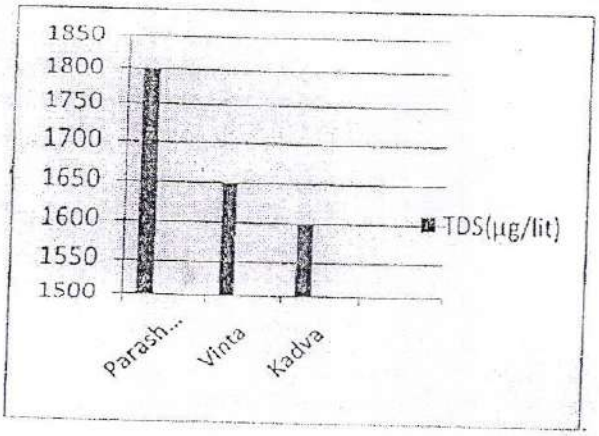
Graph.3: Comparison of BOD of various river water



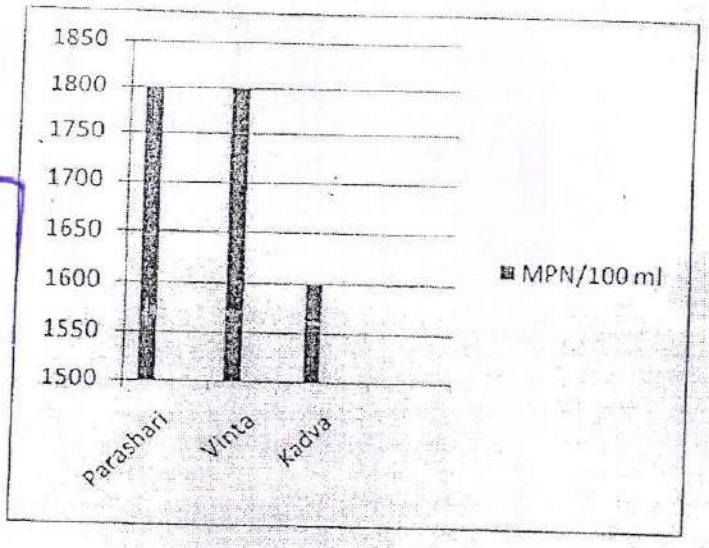
Graph.4: Comparison of DO of various river water



Graph.5: Comparison of TDS of various river water



Graph.6: Comparison of MPN in various river water



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